An Interdisciplinary Analysis of MULTISPECTRAL SATELLITE Data for Selected Cover Types in the Colorado Mountains, Using Automatic Data Processing Techniques.

EREP S398

For: September 1973

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Monthly Progress Report

MONTHLY PROGRESS REPORT
For September 1973

A. Overall Status and Progress to Date

A.1 The area surrounding Vallecito, Lemon and Rio Grande Reservoirs is currently being mapped for vegetation using a new mapping symbol system (see the attachment). These maps are being prepared on a scale of 1:24,000 and are utilizing imagery from Missions 238, 239, 247, and 248.

A.2 In conjunction with the ERTS project, continued analysis of ERTS data in this test site has shown that variations in slope, aspect, and density of the forest stands will cause major differences in the spectral characteristics of the ERTS data and such differences are also expected in the SKYLAB data. The results of this ERTS data analysis will be utilized as baseline data to determine the improvement in accuracy that can be achieved using different wavelength-band combinations of the S-192 data from SKYLAB.

A.3 Climatic data collection was made on Niwot Ridge during GT 16/REV 1791, 15 September 1973, by an INSTAAR field team. These tables include temperature, energy flux and wind profile (see attached tables).

A.4 To evaluate the possible detection of permafrost areas in the alpine zone, a methodology is being prepared to produce maps of potential permafrost occurrence. Using available data from Niwot Ridge in the front range, certain select parameters are being evaluated to generate such a map. Areas of snow accumulation have an insulating effect and can be mapped. These are then eliminated from the preliminary designated areas of potential permafrost occurrence. This evaluation is being done using Mission 211 imagery.

A.5 The decision on which set of photographic data to be densitometered has not been made pending receipt of the photographic data from the SL-3 mission. Currently the SL-3 photography is expected to arrive the second week in November.

A.6 In addition to the above activities, notes from the summer's fieldwork activities have been compiled. Slides taken in conjunction with the scheduled SKYLAB overpass of 3 August 1973, have been labeled and cataloged.

B. Recommendations

B.1 The S-192 data tapes are necessary to begin the major significant research activities for this project, and any efforts that can be made to expedite our receipt of this data in the near future would be sincerely appreciated.

B.2 Determination by NASA of the procedures to be followed in having original SL-2 photography digitized by Meade Technology Labs will allow us to proceed with plans for comparing original and duplicate photography, as well as scanner data, as outlined in the milestone plan.

C. Expected Accomplishments

C.1 Vegetation maps will be completed for the SL-2 and SL-3 data sites. Permafrost maps will be drawn for the San Juan Mountains test site using methodology and parameters as determined from the Niwot Ridge study.

D. Significant Results

There are no author identified significant results in this report.

E. Summary Outlook

Continued lack of multispectral scanner data from the S-192 is causing a growing concern in our ability to achieve the stated objectives at the time indicated in the approved Milestone Plan. The contract is nearing the halfway point and we still do no have the S-192 data. It would appear at this time that perhaps some modifications of the Milestone Plan will be necessary, particularily if later improvements in the data quality of the S-192 data tapes can be obtained which would allow more accurate analysis to be achieved.

MAP CATEGORIES
&
COVER TYPE BREAKDOWN

9/14/73

Attachment 1

General	Level 1		Level 2			Level 3
FOREST	C	Conifer(Con)	.1	Pinon- Juniper(PJ)	.01	0- 30%
			.2	Ponderosa Pine(P.Pine)	.02	30- 70%
			.3	Doug Fir - Wt. Fir(DWF)	.03	70- 100%
			.4	Spruce - Fir(SF)		
			.5	krummholz(Krum)		
			.6	Col. Blue Spruce(CBS)		as above
	M	Deciduous- Coniferous(De-Con)	.1	DWF, P. Pine,(other con?)& Aspen(Mix)		as above
	D	Deciduous(Decid)	.1	Cottonwood- Willow(Cot-Wil)		
			.2	Alpine Shrub(AS)		
			.3	Oak- Shrub(OS)		
			.4	Oak(O)		
			.5	Aspen(A)		
HERBACEOUS	A	Agricultural(Agrl)	.1	Cultivated Crops(Cul. Crop)		
			.2	Cultivated Pasture(Cul. Past)		
			.3	Pasture(Past)		
	N	Non- Agricultural(Non-Ag)	.1	Meadow(M)		
			.2	Tundra(T)	.01	0-30%
					.02	30- 70%
					.03	70- 100%
			.3	Wet Meadow(Wet Mead)		
NON- VEGETATED	B	Rock - Soil(Bare)	.1	Exposed Rock(B. Rock)		
			.2	Exposed Soil(B. Soil)		Wet
						Dry
		Shadow		Ridge Shadow(Shadow R)		
				Cloud Shadow(Shadow C)		
	W	Water		Clear		
				Turbid		
		Snow		Snow only		
				Snow - Forest Mix(Snow - For)		
		Cloud				
	U	Urban				

TEMPERATURE DATA

Niwot Ridge

September 15, 1973

Time (MST)	Profile 1* cm				Profile 2* 30 cm	70 cm	Psychrometer 1		2		Soil -10 cm	-20 cm
11:00	10.0	9.4	7.2	7.2	11.1	9.4	12.2	5.6	10.6	3.9	7.8	4.4
11:15	11.1	10.0	9.9	8.9	9.9	10.0	10.6	3.4	8.9	2.2	8.3	4.4
11:30	10.0	8.9	7.8	7.2	11.7	10.5	10.6	2.8	8.9	1.7	8.9	4.4
12:00							11.7	3.9	11.7	3.3		
12:15	11.1	11.1	10.0	8.9	12.2	10.5					10.6	4.4
12:30	11.4	10.0	9.9	9.2	11.1	11.7	12.8	3.9	12.2	3.9	10.3	4.7
12:45	11.7	10.5	11.1	8.9	14.7	11.7					10.6	5.0

* Corrected upward 2°F (1.1°C)

ENERGY FLUX DATA

Niwot Ridge

September 15, 1973

Time (MST)	ΔG(cal cm^{-2} min^{-1}) -25	-5	-10	-20 cm	Ts (°C) (FRT-10)	Lysimeter
11:00	.156	.105	.017	.0003	32	
11:15					35	
11:45					32	
12:00					31	
12:15	.172	.119	.035	.0007	33	
12:30						.0099
12:45	.171	.116	.043	.0090	36	

ENERGY FLUXES (cal cm^{-2} min^{-1})

Niwot Ridge

September 15, 1973

Time (MST)	S	S(1-∝)	I↑	I↓	Rn	Rn(calc)	Cloud
11:00	1.29	1.03	0.59	0.44	0.79		6 Cu
11:15			0.73	0.42			
11:30			0.68				5 Cu
11:45							
12:00	1.31	1.04	0.69	0.40	0.76		2 Cu
12:15	1.31	1.04	0.71	0.40	0.80		2 Cu
12:30							
12:45	1.30	1.04	0.74	0.40	0.72		3 Cu

∝ = .203 (avge. of 16 readings)

WIND PROFILE (m.p.h.)

Niwot Ridge

September 15, 1973

Time (MST)	35	70	140	200	280	400	566	775 cm	
11:00	6.6	8.9	11.9	13.1	14.7	15.6	19.0	22.6	Fence installed
11:15	8.5	11.5	14.7	16.6	19.3	20.1	22.2	22.3	
11:30	9.5	13.2	14.9	20.3	22.9	24.5	28.3	30.3	
	↓	↓	↓	↓	↓	↓	↓	↓	
12:15	10.6	15.9	19.5	23.4	26.3	28.8	30.2	35.0	
12:30	9.2	12.5	15.2	18.9	20.4	22.4	24.4	29.2	
12:45	10.3	14.2	16.5	21.1	23.3	24.6	27.0	32.7	

WIND PROFILE (m.p.h.)

Niwot Ridge

September 15, 1973

Time (MST)	"Upwind" m/sec					
	20	40	80	160 cm	70 cm	Direction
11:00	5.4	6.7	-	9.0	3.5	W
11:15	6.6	8.7	-	11.5	4.4	W
11:30	8.0	10.2	12.2	13.8	5.2	W
11:45	↓	↓	↓	↓	↓	
12:00						NW
12:15	9.1	11.9	14.4	16.5	6.3	SW
12:30	7.9	9.8	11.8	13.3	4.9	SW
12:45	8.1	10.6	12.5	14.1	5.2	SW